

**DEPARTMENT OF PHYSICS AND ASTRONOMY**  
**CONDENSED MATTER SEMINAR**

**Friday, November 4, 2016**  
**3:30 PM, Physics, Room 203**  
**(Refreshments 3:00 PM, Physics, Room 242)**



**Professor Claudio Chamon**

Department of Physics, Boston University

**Braiding Light**

Many topological phenomena first proposed and observed in the context of electrons in solids have recently found counterparts in optical and acoustic systems. In this talk I will discuss non-Abelian Berry phases that can accumulate when coherent states of light are injected into “topological guided modes” in specially-fabricated photonic waveguide arrays. These modes are photonic analogues of topological zero modes in electronic systems. Light traveling inside spatially well-separated topological guided modes can be braided, leading to the accumulation of non-Abelian phases, which depend on the order that the guided beams are wound around each other. Notably, these effects survive the macroscopic photon occupation limit, and can be understood as wave phenomena and thus predicted directly from Maxwell's equations without resorting to quantization of light. We propose an optical interference experiment to probe this non-Abelian braiding of light directly.